

STATEMENT

by Assoc. Prof. Stoyanka Atanasova, PhD,
The "Paisii Hilendarski" Plovdiv University, Faculty of Chemistry,
Department of Organic Chemistry

Subject: PhD defence, 4. „Natural science, mathematics and informatics”, 4.3. „Biological science”, „Bioorganic chemistry, chemistry of natural and physiologically-active compounds”

Name of the PhD Student: Yoana Georgieva

Title of Thesis: *Scutellaria Altissima* L. (Lamiaceae) – Source of biologically significant flavonoids and diterpenes

Supervisors: Assoc. Prof. Stela Dimitrova, PhD, Medical University – Plovdiv

Assoc. Prof. Petko Bozov, DSc, The "Paisii Hilendarski", Plovdiv University

Member of Jury, designated by a written order P-786/25,05,2021 of the Rector of the Medical University - Plovdiv

1. Introduction.

The PhD thesis consists of 6 chapters, 7 preliminary pages and 100 pages with the Introduction, Literature review, Aims, Materials and methods, Results and discussion, Conclusion, References, etc.

2. Relevance of the topic.

The genus *Scutellaria* belongs to one of the most widely used in traditional medicine and is the subject of many phytochemical studies of the plant family Lamiaceae. About 350 species are known to be common in East Asia, Europe and North America. *Scutellaria* species are well known for their biologically active compounds and therefore for their therapeutic properties. In the flora of Bulgaria, genus *Scutellaria* is represented by 8 species: *S. albida*, *S. alpina*, *S. altissima*, *S. columnae*, *S. galericulata*, *S. hastifolia*, *S. orientalis* ssp. *pinnatifida*, *S. velenovskyi*. The interest has been focused mainly on the terpenes in them. The aim of the PhD thesis is to enrich the information about the composition of the Bulgarian *Scutellaria* species in terms of both polyphenolic content and diterpenes, as well as primary metabolites such as mono-, oligosaccharides and organic acids.

3. Evaluation of the PhD thesis.

The dissertation has original scientific results. The chapters are chronologically ordered. The purpose of this study is to enrich the information on the composition of the Bulgarian *Scutellaria* species in terms of both total polyphenolic and flavonoid content, as well as, primary metabolites such as mono- and oligosaccharides and organic acids. *Scutellaria* species growing in different areas at the foot of the Rhodope Mountains were selected for the purpose of analysis. It is noteworthy that *S. altissima* from both regions Mezek and Bachkovo and *S. Galericulata* (P) show a higher total amount of polyphenols and flavonoids compared to *S. albida*.

The climate variation of the area affect the synthesis of biologically active substances. It is important to note that the flavonoids scutellarin, baicalin, baicalein, wogonin, wogoninide and a caffeoyl phenylethanoid glycoside - verbascoside, responsible for the therapeutic action of *Scutellaria baicalensis* (Baikal skullcap) and *Scutellaria lateriflora* (American skullcap) are found for the first time in species of the genus *Scutellaria* growing in Bulgaria.

The PhD thesis describes the isolation and structure elucidation of six compounds, four neo-clerodane diterpenes, and two other constituents from the stems of *S. altissima* growing around Troian. Due to the highest percentage of flavonoids in *Scutellaria altissima*, it's chosen for the extraction. Six compounds are found and are reported for the first time in Bulgaria.

Validation of a new HPLC method for identification of the flavonoids: scutellarin, baicalin, baicalein, wogonin, wogonoside, luteolin, chrysin and a caffeoyl phenylethanoid glycoside-verbascoside is shown. In the dissertation, a comparative research of the amounts of secondary (polyphenols and flavonoids) and primary (organic acids and carbohydrates) metabolites in the aerial part of three species of *Scutellaria* growing in four lowland regions of Southern Bulgaria, has been performed.

Extract of *Scutellaria altissima* and *Streptococcus mitis* showed antimicrobial effect.

All of the isolated neo-clerodanes showed excellent antifeedant activity against *Leptinotarsa decemlineata* Say.

The PhD student presented 5 articles, 4 conference papers and 7 citations, connected with the topic of the dissertation.

CONCLUSION

Yoana Georgieva as a well motivated and independent person who can work independent, setting her own research goals. During her PhD, Yoana Georgieva improved her ability to perform high-quality research.

In conclusion, I recommend Y. Georgieva's thesis to be accepted for defense.

Plovdiv
09.07.2021 г.

(Assoc. Prof. Stoyanka Atanasova, PhD)